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EXAMINER

DEGUIRE, KATHERINE E

ART UNIT	PAPER NUMBER
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1781

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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/579,082	Applicant(s) BERCKMANS ET AL.	
	Examiner KATHERINE DEGUIRE	Art Unit 1781	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 July 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-16,20 and 22-25 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-16,20 and 22-25 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

Claim Rejections - 35 USC § 103

Claims 1-16,20,23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Idaszak (US #4,021,927) in view of Vezzani (EP 0710670 A1,).

Regarding claim 1, Idaszak discloses a method for modifying starch or starch derivatives (column 3, lines 47-50) comprising:

- a. Introducing a continuous flow of starch substrate, gas, (column 3, lines 57-65) and optionally, one or more reagents (column 5, lines 35-45), into a reactor,
- b. Wherein the starch substrate has a moisture content between 10-12% by weight (column 4, lines 10-20)
- c. A residence time in the reactor of less than 1 hour and is heated to between 125 and 380° F (column 8, lines 10-20),
- d. Characterized in that the starch substrate and the gas are introduced into the reactor in opposing directions (column 3, lines 47-65 disclose that this preferably occurs counter-currently)
- e. An agitator means in the upper and lower chamber in the form of multi-bladed upthrust impellers to convey the starch from the inlet to the outlet(column 5, line 50-62).

Idaszak fails to disclose that the reactor contains a cylindrical body.

However, Vezzani discloses a method of modifying starches in a cylindrical reactor, wherein the reactor contains a bladed rotor which conveys the starch

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substrate from the inlet of the reactor to the outlet (column 2, lines 1-30).

Vezzani teaches that the reactor has a cylindrical tubular design thus demonstrating that it is conceivable for a reactor to be both cylindrical and tubular internally (column 2, line 1-6). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the reactor of Idaszak to have a cylindrical tubular design in order to convey the starch from the inlet of the reactor to the outlet as disclosed in Vezzani because the reactor design combined with the agitation applied by a rotor within the reactor favors the completion of the modification reaction (column 2, lines 39-43).

Regarding claims 2, 20, Idaszak and Vezzani disclose the method according to claim 1. Based on the diameter of the reactor tubes of Idaszak (column 13, table) and the rpm range of 300-1500 rpm disclosed in Vezzani (column 2, lines 5-10), the tip speed of a blade in the method according to Idaszak and Vezzani will be between 1-5 m/s.

Regarding claim 3, Idaszak teaches that the starch has 10-12% moisture (column 4, lines 10-20)

Regarding claim 4, Idaszak teaches that the starch is a native starch or a starch derivative (column 7, lines 45-55).

Regarding claim 5, Idaszak and Vezzani disclose the method of claim 1 but fail to explicitly disclose that the starches are added to the reactor in powdered form. However, Idaszak discloses that the starches introduced to the reactor are starches such as cornstarch and potato starch (column 7, lines 45-55). These starches are well known in the art to generally come in

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powdered form. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to add starch to the reactor in a powdered form, since starches like the ones used in Idaszak are well known to come in powdered form, and there is no suggestion to use the starch in another form. In other words, if one having ordinary skill in the art at the time of the invention were to practice the invention of Idaszak absent instruction to change the form of the starch to one other than a powder, they would have used starches like cornstarch or potato starch in powdered form, because the art accepted definition of these starches provides for them being in powdered form.

Regarding claims 6-7, the reagent disclosed is an acid (column 5, lines 35-45), specifically hydrochloric acid, which is a mineral acid.

Regarding claim 8, the reagents are added in an amount between 0.001 to 0.10 by weight (column 8, lines 1-7).

Regarding claim 9, it is disclosed that the hydrochloric acid may be added as a gas (example 1).

Regarding claim 10, the acid is added to the starch prior to being added to the reactor (column 7, lines 55-60).

Regarding claim 11, the residence time is disclosed to frequently range from 10-30 minutes (column 8, lines 15-17).

Regarding claim 12, the temperature of the reactor is disclosed to be within a temperature range of 125-380° F (column 8, lines 12-15).

Regarding claim 13, the gas introduced to the reactor can be air, steam, or nitrogen (column 8, lines 27-32)

Regarding claim 14, 24, 25, Idaszak discloses a method for preparing a highly soluble starch comprising introducing a continuous flow of starch substrate, gas and a mineral acid into a reactor (column 3, lines 57-65, column 5, lines 35-45, example 1), wherein the starch substrate has a moisture content between 10 and 12% by weight (column 4, lines 15-20), a residence time in the reactor of between 10 and 30 minutes and is heated to between 170 and 375 ° C (column 8, lines 12-17), characterized in that the starch substrate and the gas are introduced into the reactor in opposing directions (column 3, lines 47-65 disclose that this preferably occurs counter-currently). Idaszak further teaches an agitator means in the upper and lower chamber in the form of multi-bladed upthrust impellers to convey the starch from the inlet to the outlet.

Idaszak fails to disclose that the reactor contains a cylindrical body. However, Vezzani discloses a method of modify starches in a cylindrical reactor, wherein the reactor contains a bladed rotor which conveys the starch substrate from the inlet of the reactor to the outlet (column 2, lines 1-30). It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the reactor of Idaszak to contain a cylindrical body because the cylindrical body reactor favors the completion of the modification reaction (column 2, lines 39-43).

Regarding claim 15, Idaszak discloses the method of claim 14, but fails to explicitly disclose that the reaction occurs under alkaline conditions. However, Idaszak discloses that adjusting the pH (the alkalinity or acidity) of the reaction conditions can allow practitioners of the invention to choose if a certain

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agent will bleach or oxidize a starch. Therefore it would have been obvious to one having ordinary skill in the art to adjust the alkalinity of the reaction conditions for the intended application, since it has been held that determining the optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F. 2d 272, 205 USPQ 215 (CCPA 1980).

Regarding claim 16, the highly soluble starch is 94.5% soluble in 25° C water (example 1, test #4050).

Regarding claim 24, Idaszak teaches a jacket which serves to provide heat to the reactor walls and subsequently to the starch particles (identified as 32 on figures 1 and 2, column 6, line 27-40).

Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over Idaszak (US #4,021,927) in view of Vezzani (EP 0710670 A1) further in view of Ferguson(US 5766366).

Regarding claim 22, Idaszak and Vezzani do not specifically teach that the starch substrate is conveyed from the inlet to the outlet in a continuous, plug-flow type manner. However, Ferguson teaches a method of hydrolyzing starch in which the starch is conveyed from the inlet to the outlet in a continuous, plug-flow reactor.

Ferguson teaches that the advantage of plug flow reactors is that the retention time can be held substantially identical for all the starch being produced. This allows for uniformity and greater ease in automation of the process(column 3, line 54-60).Thus, it would have been obvious to modify

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Idaszak and Vezzani with Ferguson by using a plug flow reactor in order to achieve uniformity with starch flow and starch retention time.

Response to Arguments

Applicant's arguments filed 07/15/2011 have been fully considered but they are not persuasive.

The applicant argues that

The reactor in Idaszak includes three zones in series: an upper fluidized zone which is continuously subjected to mechanical agitation and where the starch substrate and reagents are introduced; a lower fluidized zone which is continuously subjected to mechanical agitation and where the gas is introduced; and a plurality of tubular zones intermediate to the upper and lower zones where the fluidized solids are subjected to heat transfer (see, for example, column 15, lines 45-60 and Figure 1). On the other hand, the claimed methods require a reactor system that includes a single reactor in which movement occurs from the introduction of the starch substrate and the gas in opposite directions as well as the configuration of the blades. The features of the reactor and the claimed method results in conditions that are not homogeneous; that is, the temperature increases from inlet to outlet, and the amount of modified starch increases from inlet to outlet. Those skilled in the art would appreciate that the hydrodynamics in a cascade of a two- tank reactor (i.e., as disclosed by Idaszak) is different from the hydrodynamics in a reactor having blades (i.e., as recited in the claimed methods). Their behavior is governed by different equations; their residence times are different; the variations of conditions within the reactors are different; and the heating and heat distributions are very different.

The office respectfully disagrees. First, Idaszak teaches every feature of claim 1 except for the cylindrical body. Specifically,

Introducing a continuous flow of starch substrate, gas, (column 3, lines 57-65) and optionally, one or more reagents (column 5, lines 35-45), into a reactor,

Wherein the starch substrate has a moisture content between 10-12% by weight (column 4, lines 10-20)

A residence time in the reactor of less than 1 hour and is heated to between 125 and 380° F (column 8, lines 10-20),

Characterized in that the starch substrate and the gas are introduced into the reactor in opposing directions (column 3, lines 47-65 disclose that this preferably occurs counter-currently)

An agitator means in the upper and lower chamber in the form of multi-bladed upthrust impellers to convey the starch from the inlet to the outlet(column 5, line 50-62).

Thus, it is unclear how Idaszak teaches a different type of reactor system than the claimed invention if the reference teaches all the key features of the claimed invention. The applicant states that the claimed methods require a reactor system that includes a single reactor in which movement occurs from the introduction of the starch substrate and the gas in opposite directions as well as the configuration of the blades.

First, nowhere in the claims is it recited that the claimed reactor system includes a single reactor. Second, the Idaszak teaches that the movement of the starch occurs from the introduction of the starch substrate and the gas in opposite directions and also teaches an agitator means in the form of blades. These features are the same as the ones that the applicant argues are required of the claimed method. Thus, Idaszak teaches the same type of reactor system as in the claimed method according to the applicant's arguments above.

Even if there are differences between the reactor system of Idaszak and of the claimed invention, Idaszak and Vezzani still teach all the limitations of the claimed invention. The possible differences that the applicant has pointed out do not involve any of the claimed features. Thus, the applicant's arguments are not in accordance with the scope of the claimed invention.

The applicant further argues that the secondary reference Vezzani does not teach that the air flow and the starch are in opposing directions. However, the primary reference Idaszak teaches that the air flow and starch are in opposite directions as stated above.

Note that while Vezzani do not disclose all the features of the present claimed invention, (reference name) is used as teaching reference, and therefore, it is not necessary for this secondary reference to contain all the features of the presently claimed invention, *In re Nievelt*, 482 F.2d 965, 179 USPQ 224, 226 (CCPA 1973), *In re Keller* 624 F.2d 413, 208 USPQ 871, 881 (CCPA 1981). Rather this reference teaches a certain concept, namely a cylindrical tubular reactor, and in combination with the primary reference, discloses the presently claimed invention.

The applicant further argues that the reactors of Idaszak and Vezzani are different and it would not have been obvious to combine the two references. However, the purpose of the Vezzani reference is to demonstrate that reactors can be cylindrical and tubular and that the cylindrical shape helps to complete the reaction. Accordingly, the applicant has not demonstrated as to why one of

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ordinary skill in the art would not have modified the reactor of Idaszak to have a cylindrical and tubular body when the concept is known in the art.

The applicant is arguing that one would not have been motivated to modify Vezzani with Idaszak due to the supposed difference between the two systems. However, the modification proposed by the office is one of modifying Idaszak with Vezzani, not Vezzani with Idaszak. Thus, the applicant's arguments do not apply to the rejection at hand.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KATHERINE DEGUIRE whose telephone number is (571)270-1136. The examiner can normally be reached on Monday through Friday 9-5:30 EST.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Examiner, Art Unit 1781

/D. Lawrence Tarazano/
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